

WHAT IS CLAIMED IS:

1. A method for cleaning lens used in an immersion lithography system (ILS), the method comprising:

 positioning a wafer in the ILS; and

 performing a light exposing operation on the wafer using an objective lens immersed in a first fluid containing surfactant.
2. The method of claim 1 wherein the wafer is coated with photoresist.
3. The method of claim 1 wherein the first fluid forms an immersion lens.
4. The method of claim 1 wherein the surfactant reduces a surface tension of the objective lens with the first fluid.
5. The method of claim 1 wherein the surfactant changes a surface property of the wafer to make it more hydrophilic.
6. The method of claim 1 further comprising cleaning the objective lens after the light exposing operation using a second fluid having a higher surfactant concentration than the first fluid.
7. The method of claim 6 further comprising providing the first fluid before starting the light exposing operation.
8. The method of claim 1 wherein the first fluid reduces floating defects including photoresist defects or micro-bubbles.

9. A method for cleaning lens used in an immersion lithography system (ILS), the method comprising:
 - positioning a wafer in the ILS;
 - performing a light exposing operation on the wafer using an objective lens immersed in a first fluid that does not contain surfactant; and
 - cleaning the objective lens using a second fluid comprising a surfactant-spiked water immersion fluid.
10. The method of claim 9 wherein the wafer is coated with photoresist.
11. The method of claim 9 wherein the first fluid is a de-ionized water.
12. The method of claim 9 wherein the surfactant is ionic.
13. The method of claim 9 wherein the surfactant is non-ionic.
14. The method of claim 9 wherein first and second fluids reduce floating defects including photoresist defects or micro-bubbles.
15. An immersion lithography system comprising:
 - means for positioning a wafer;
 - means for providing the first fluid containing no surfactant;
 - means for performing a light exposing operation on the wafer using an objective lens immersed in the first fluid; and

means for providing a surfactant to the first fluid to form a second fluid to reduce an adherence of floating defects to the wafer or the objective lens.

16. The system of claim 15 further comprising means for collecting the first fluid.
17. The system of claim 15 wherein the first fluid forms an immersion lens.
18. The system of claim 15 wherein the first fluid is de-ionized water.
19. The system of claim 15 further comprising means for collecting the second fluid.
20. A method for cleaning lens used in an immersion lithography system (ILS), the method comprising:
 - positioning a wafer in the ILS;
 - performing a light exposing operation on the wafer using an objective lens immersed in a first fluid; and
 - cleaning the objective lens using a second fluid containing surfactant.
21. The method of claim 20 wherein the wafer is coated with photoresist.
22. The method of claim 20 wherein the first fluid is a de-ionized water.
23. The method of claim 20 wherein the second fluid comprises NH_4OH .
24. The method of claim 23 wherein the second fluid further comprises peroxide (H_2O_2).

PATENT

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25. The method of claim 24 wherein the second fluid further comprises water.
26. The method of claim 20 wherein the second fluid comprises ozone (O₂)
27. The method of claim 20 wherein the second fluid comprises peroxide (H₂O₂).